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New York (State)
Industrial Commission
Industrial code

New York

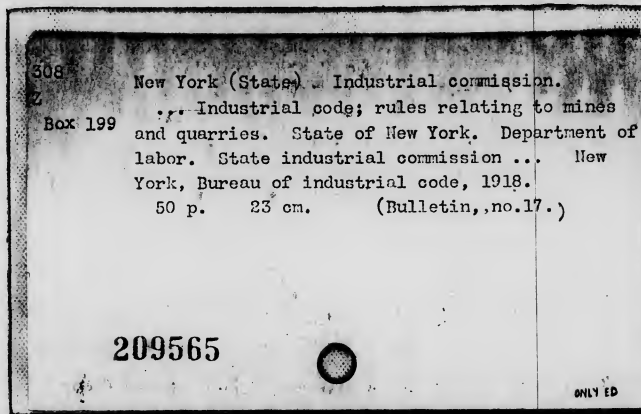
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BULLETIN NO. 17

INDUSTRIAL CODE

RULES

RELATING TO

Mines and Quarries

STATE OF NEW YORK
DEPARTMENT OF LABOR
STATE INDUSTRIAL COMMISSION

ALBANY

NEW YORK OFFICE, 230 FIFTH AVENUE

BUREAU OF INDUSTRIAL CODE

230 Fifth Avenue, New York City

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Box 199

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July 1, 1918
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Law, Section 119. Protection of employees in mines, tunnels and quarries. Every necessary precaution shall be taken to insure the safety and health of employees employed in the mines and quarries and in the construction of tunnels in the state. The industrial board shall have the power to adopt rules and regulations to carry into effect the provisions of this article and may amend or repeal rules and regulations heretofore prescribed by the commissioner of labor under the provisions of this article. The rules and regulations heretofore prescribed by the commissioner of labor under this article shall continue in force until amended or repealed by the industrial board.

The rules contained in this bulletin were adopted by the State Industrial Commission in accordance with the requirements of sections 51-a and 52 of the Labor Law, and became effective July 1, 1918.

RULES AND REGULATIONS RELATING TO MINES

Rule 1000. Definition of Terms

(a) Application. These rules shall apply to all mines in the State of New York producing minerals within the meaning of that term, as hereinafter defined.

(b) Singular and Plural Numbers. For the purpose of these rules, the singular number when used in reference to persons, acts, objects, and things of whatsoever kind and description, shall, whenever the context will permit, be taken and held to import and include the plural number, and the plural number shall similarly be taken and held to import and include the singular.

(c) Mine. The term "mine" shall include prospect openings, pits, banks and open-cut workings employing an average of five (5) or more men, and shall embrace any and all parts of the property of such "mine" and mining plant, on the surface or underground, that contribute directly or indirectly to the mining or handling of minerals. Provided, that when a group of workings in proximity to one another and under one management are administered as distinct units, each working shall be considered a separate mine.

(d) Mineral. The term "mineral" shall mean whatever is recognized by the standard authorities as mineral, whether metalliferous or non-metalliferous, but shall not be held to embrace or include coal, lignite, gas, oil, or any substances when extracted in solution or in the molten state through bore holes.

(e) Operator. The term "operator" shall mean the person, firm, or body corporate in immediate possession of any mine and its accessories as owner or lessee thereof, and as such responsible for the condition and management thereof.

(f) Superintendent. The term "superintendent" shall mean the person having immediate supervision of the operation.

(g) Mine Foreman. The term "mine foreman" shall mean a person who at any one time is charged with the general direction of the underground work.

(h) Excavations or Workings. The terms "excavations" and "workings" shall signify any or all parts of a mine excavated or being excavated, including shafts, raises, tunnels, entries, galleries, open cuts, and all working places, whether abandoned or in use.

(i) Number of Men. Whenever the expression "number of men" or "average number of men" employed in a mine is used in these rules, as defining or constituting classes of mines to which these rules do or do not apply, such expressions shall be construed to mean the average number of men employed during the previous year, as shown by the returns to the mine inspector or by the books or pay roll of the mine, or by all of such means, and such average number shall be determined by dividing the total number of man shifts by the number of days the mine was worked during such period.

(j) Magazine. The term "magazine" as used in these rules shall be held to mean and include any building or other structure or place in which explosives are stored or kept, whether above or below ground.

(k) Explosive. The term "explosive" or "explosives" shall be held to mean and to include any chemical compound or any mixture that contains any oxidizing and combustible units or other ingredients in such proportions, quantities or packing, that an ignition by fire, by friction, by concussion, by percussion, or by detonation of any part of the compound or mixture may cause such a sudden generation of highly heated gases that the resultant pressures are capable of producing destructive effects on contiguous objects or of destroying life and limb.

(l) Person. The term "person" shall be held to mean and include a firm or body corporate as well as natural persons.

(m) Underground. The term "underground" shall be held to mean within the limits of any mine working or excavation.

(n) Employees. The terms "employees" and "men employed" shall be held to mean all men receiving compensation from the operator, directly or indirectly, for labor or services performed in connection with the mine, and shall include contractors, lessors, lessees, tributers, or anyone else similarly employed.

(o) Approved. The term "approved" shall be held to mean approved by the Industrial Commission.

Rule 1001. General

(a) The operator and superintendent of every mine shall use every reasonable precaution to insure the safety of the workmen in the mine in all cases, whether provided for in these rules or not.

(b) All defects in or damage or injury to machinery or timbering, or to apparatus and equipment generally in and about a mine,

all unsafe or dangerous conditions in any part of the mine, and all accidents occurring in the course of mining operations, other than those of a purely minor character, even though not resulting in personal injury, shall be promptly reported to the mine foreman or superintendent by the person observing the same.

(c) Wages shall not be paid on any premises used for the sale of intoxicating liquors.

(d) Each workman employed in the mine, when first engaged, shall have his attention directed to the general and special rules provided for in these rules.

Rule 1002. Superintendent

The operator of every mine shall appoint a man who shall be personally in charge of the mine and the performance of the work done therein, who shall be designated as the "superintendent"; provided, however, that nothing herein contained shall prevent the owner or operator of any mine from personally filling the office of superintendent.

The superintendent of every mine shall inspect or cause some competent person or persons appointed by him to inspect all mining appliances, boilers, engines, magazines, shafts, shaft houses, underground workings, roof, pillars, timbers, explosives, bell ropes, speaking tubes, telephone, tracks, ladders, dry closets, and all parts and appliances of said mine in actual use, and any such person or persons appointed by the said superintendent shall at once report any defects therein to the superintendent. It shall be the duty of the superintendent, upon ascertaining such defects, to take immediate steps to remedy the same, so as to make the same comply with the provisions of these rules, and he shall forthwith notify the operator of said mine or quarry of the existence of such defects. It shall be the duty of the superintendent to appoint a competent man to have full charge, under the direction of said superintendent, of every magazine containing explosives situated on such mining property, and to make such other appointments and perform such other duties as are provided by these rules to be performed by such superintendent.

Rule 1003. Care of Injured

It shall be the duty of operators, superintendents, or anyone in charge of any mine, to keep at such place about the mine as may be designated by the Industrial Commission, a stretcher, a woolen

blanket, and a waterproof blanket in good condition for use in carrying any person who may be injured at the mine. Where more than one hundred (100) persons are employed, two (2) stretchers, two (2) woolen blankets and two (2) waterproof blankets shall be kept. At all mines an adequate supply of materials shall be kept readily accessible for the treatment of anyone injured, and shall include the following in suitable quantity: First-aid outfits consisting of one extra-long gauze bandage with compress sewed in its center, one triangular bandage with methods of application printed thereon, two safety pins, and one card of instructions; large first-aid dressings for wounds; packages of sterilized gauze; assorted bandages; United States Army tourniquet; carbolated vaseline or boric acid ointment; packages of picric acid gauze; wooden or wire-gauze splints; packages of absorbent cotton; safety pins; shears; tweezers; aromatic spirits of ammonia; paper cups; first-aid book of instructions; soap; basins; towels. Furthermore, in all mines where one hundred (100) or more men are employed, a first-aid corps shall be organized, consisting of the foreman or foremen, shift bosses, timekeepers, or other employees designated by the superintendent; and it shall be the duty of the operator or superintendent of the mine to cause the organization of such employees and to procure the services of a competent person to instruct the members of such first-aid corps from time to time, not less than once in every three months, in the proper handling and treatment of injured persons before the arrival of a physician; except that where a hospital is maintained in connection with a mine, there shall be provided only such first-aid equipment as may be reasonably necessary to prepare the injured employee for removal to the hospital.

Rule 1004. Mine Maps

The operator of every mine shall make and maintain, or cause to be made and maintained by a competent engineer or surveyor, a clear and accurate map, or maps, of uniform scale, not less than one hundred (100) feet to the inch, with sections, showing clearly all the workings of such mine. At least once in every six (6) months, or oftener, if necessary, the operator or superintendent of each mine shall cause to be shown clearly and accurately on the map or maps of such mine all the excavations made therein during the time elapsed since such excavations were last shown on such map or maps, and all parts of such mine that

shall have been worked out or abandoned during said elapsed period of time shall be clearly indicated on said map or maps, and all underground workings shall be surveyed and mapped before they are allowed to become inaccessible. Such maps shall at all times be open to the examination of the Industrial Commission. In the event of the closing of a mine under conditions that will result in its workings becoming inaccessible, the maps herein specified, or certified copies of them, shall be filed with the Industrial Commission.

Rule 1005. Inflammable Material

(a) It shall be the duty of the operator of every mine in which oils and other dangerous inflammable materials are used, to store such materials, or cause them to be stored, in a covered building kept solely for such storage, which building shall be at least one hundred (100) feet from any shaft, tunnel, or other mine opening, or any building directly connected with a mine opening, and at least three hundred (300) feet from any powder magazine; provided, that gasoline, naphtha, distillate, and fuel oils may be stored in a tank or tanks buried in the ground, which tank or tanks shall be provided with proper vents, and shall be placed at least fifty (50) feet from any shaft, tunnel, or other mine opening, or any building directly connected with a mine opening, and at least three hundred (300) feet from any powder magazine; and provided further, that lubricating oils may be stored in a well-constructed covered building, which shall be at least fifty (50) feet from any shaft, tunnel, or other mine opening, or any building directly connected with a mine opening, and at least three hundred (300) feet from any powder magazine. No tank shall be installed from which oil is to be conducted by gravity to the point of combustion, unless such tank shall be so located that escaping oil cannot run over the surface from such tank to any building, within one hundred (100) feet of any mine opening.

(b) The man in charge of such building or tank or tanks, who shall be the superintendent or a person expressly designated by him, shall permit only sufficient oil or other inflammable material to be taken from such building or tank or tanks to meet the requirements of paragraph (c). If any oil or gasoline storage be so situated that leakage would permit the oil or gasoline to flow within the above specified distances, means to prevent such flow must be provided.

(c) Oil, either lubricating or illuminating, shall not be taken into the underground workings of any mine, or kept therein in quantities greater than necessary to afford three days' supply, except when the transportation and storage are arranged for in a manner satisfactory to the Industrial Commission.

(d) The storage of gasoline, naphtha and other distillates underground is prohibited; provided, however, that a supply sufficient for one day's operation of blow torches, fuel burning engines or locomotives may be kept in the tank or tanks attached to such equipment.

(e) Waste timber or old timber shall not be stored and permitted to decay in the mine but shall be removed from the mine promptly. Empty boxes, wooden chips, paper and combustible rubbish of all kinds shall not be allowed to accumulate underground.

EXPLOSIVES

Rule 1006. Storage of Explosives

(a) Sufficient explosives may be stored within a mine to meet the estimated requirements of such mine during the succeeding twenty-four hours, and an additional twenty-four hours' supply of explosives may be taken within the mine for the purpose of thawing the same in accordance with the provisions of Rule 1008, but in no event shall any greater supply of explosives be taken into or stored in the mine than is required to meet the estimated requirements of the mine during the succeeding forty-eight hours.

(b) No explosive shall be kept at any place within a mine where its accidental discharge would cut off the escape of miners working therein.

(c) All daily supplies of explosives within the mine shall be kept in stout, tight boxes with hinged lids, which shall be kept securely locked except at such times as explosives are being placed therein or removed therefrom, from which the explosives shall be removed only as required for immediate use. It shall be unlawful to keep such boxes containing explosives near electric conductors other than lighting circuits, or in any required manway or adjacent to shaft landings, or to permit any grains or particles of such explosives to be or remain on the outside or about the containers in which such explosives are held. Black blasting powder and high explosives

shall not be kept in the same box, and not more than seventy-five (75) pounds of explosives shall be kept in such box.

(d) When more than seventy-five (75) pounds of explosives are kept in an underground magazine, they shall be distributed by an authorized and competent person or persons. Such underground magazine may consist of a separate drift or chamber, the walls of which shall be of fireproof material or of wood covered with sheet iron. The entrance to such underground magazine shall be kept securely locked, except when it has to be entered by the person or persons in charge thereof.

(e) Keys and access to daily supply chests shall not be allowed to any person other than a blaster, or duly authorized person.

(f) All explosives, in excess of the temporary supply authorized to be taken into or stored in the mine, shall be stored in a magazine above ground.

(g) All detonators shall be stored above ground in a suitable magazine or magazines, properly protected against molestation; provided, that a sufficient supply for the needs of the mine for forty-eight (48) hours may be stored underground, as hereinbefore stated. No detonators shall be stored within twenty (20) feet of other explosives underground. No detonator shall be taken into any magazine containing other explosives. No fuses shall be capped with detonators in any magazine or in any other place where detonators or other explosives are stored, but special benches shall be provided at least twenty (20) feet from such storage places, where all fuses shall be capped. Cap crimpers shall be furnished in sufficient quantity to avoid the necessity of crimping in any other way. No detonator shall be transported with other explosives except when made into a primer with such other explosive.

(h) All magazines located above ground shall be bullet-proof.

(i) Fuse shall not be stored underground for a longer period than forty-eight (48) hours.

(j) When supplies of explosives or fuse are removed from a magazine, those that have been longest in the magazine shall be taken first. Packages of explosives shall be removed to a safe distance from the magazine before being opened, and no such packages shall be opened with any metallic instrument.

Rule 1007. Marking of Explosives, Detonators and Fuses

It shall be unlawful for the operator or superintendent of any mine to permit the use within such mine of any explosive, or any blasting caps or detonators, or fuse, unless there shall be printed or marked on every original package containing explosives, the name and place of business of the manufacturer of such explosive, the date of its manufacture (if the date of manufacture is in code, the key to such code shall be furnished on application), and its character and grade; and on every original package containing such fuse, the name and place of business of the manufacturer of such fuse, and the date of its manufacture (if the date of manufacture is in code, the key to such code shall be furnished on application); and on every original package containing blasting caps or detonators, the name and place of business of the manufacturer of such blasting caps or detonators, the date of their manufacture (if the date of manufacture is in code, the key to such code shall be furnished on application), and their grade.

In emergencies, or when approved by the Commission, one manufacturer may supply explosives for another manufacturer, under the latter's brand.

It is recommended that employers provide common or safety fuse of uniform speed, preferably ninety (90) seconds per yard.

Rule 1008. Conveying, Thawing, Blasting, Misfires, Etc.

(a) The superintendent shall appoint a sufficient number of experienced blasters to handle explosives and to do blasting.

(b) All foremen and gang bosses shall be experienced blasters and shall supervise the handling of explosives and see that blasting operations are carried on in accordance with the rules and regulations herein prescribed.

(c) The daily quantity of explosives shall be brought at regular time daily to mine entrance, and taken directly to suitable receptacles, as herein described.

(d) Detonators shall not be carried into the mine with other explosives, nor shall any person ride in the same cage, skip or car with explosives.

(e) No blaster shall attempt to use any dynamite that is frozen, nor detonators of less than No. 6 strength.

(f) No quantity greater than is sufficient for daily use shall be artificially thawed at one time.

(g) Only approved methods of thawing shall be permitted.

(h) No person shall approach or open chests or magazines containing explosives, nor prime while using naked light.

(i) Fuse may be kept with detonators and all crimping of caps on fuse shall be done with proper crimper and at least twenty (20) feet away from explosives.

(j) Chests containing daily supply of explosives shall be protected from derailed cars, and from blasts and falls.

(k) No tools or other articles shall be kept with the explosives or with the detonators, except that the detonator chest may contain one or more crimpers, and the explosive chest may contain a hardwood wedge and mallet.

(l) All drill holes shall be of sufficient bore to admit of the free insertion to the bottom of the hole of a cartridge of explosive without ramming or removing the dynamite from its original wrapper, except for block holes.

(m) Fuse shall not be laced through cartridges for forming a primer.

(n) Foreman or shift boss shall, before drilling is commenced on any shift, ascertain whether all holes fired on the previous shift have been exploded, and shall cause all remaining holes to be examined with a wooden stick for unexploded charges or cartridges, and if any are found, same shall be refired or a new hole drilled and fired before regular drilling is commenced.

(o) Explosives shall not be extracted from a hole which has once been charged; the tamping only may be withdrawn sufficiently to allow a missed shot being fired by insertion of fresh additional charge of primer.

(p) Blaster shall be furnished with hard wood rods for tamping, and he shall not tamp or load any hole with a metal bar, nor shall the wooden rod have any metal parts; except that where black powder with no detonator is used, tamping will be permitted with a copper-tipped tamping rod.

(q) Firing shall be done by safety fuse or approved battery or from an electric current of not over two hundred and fifty (250) volts, provided a suitable switch is used, as hereinafter described. Other methods of firing may be permitted upon application and approval by the Industrial Commission.

(r) When firing by electricity from power or lighting wires in any mine, a proper switch shall be furnished with lever down

when "off." The switch shall be fixed in a locked box, to which no person shall have access except the blaster. The lead wires shall be furnished with plugs and shall not be connected with the switch till ready to fire. After blasting, the switch lever shall be pulled out, the wires disconnected, and the box locked before any person shall be allowed to return, and shall remain so locked until again ready to blast.

(s) All power lines and electric light wires shall be disconnected at a point outside the blasting switch before explosives are taken in and loading of holes is proceeded with. No current by grounding of power or lighting wires or banded rails shall be allowed beyond blasting switch after explosives are taken in preparatory to blasting, and under no circumstances shall grounded current be used for exploding blasts.

(t) The blaster shall cause a sufficient warning to be sounded and shall be responsible that all persons retreat to safe shelter before he sets off blast, and shall also see that none return until he reports it safe for them. He shall report to the mine foreman and furnish names of all persons refusing to obey his caution. Suitable and convenient shelters shall be provided.

(u) When a blaster fires a round of holes, he shall count the number of shots exploding, except in case of instantaneous blasting by electricity. If there are any misfires, he shall report the same to the gang boss or foreman. The blaster shall not leave until he has placed a wooden plug painted red, or other proper danger signal, in the mouth of the missed hole. If a missed hole has not been fired at the end of a shift, that fact, together with the position of the hole, shall be reported by the mine foreman or shift boss to the mine foreman or shift boss in charge of the next relay of miners, before work is commenced by them.

(v) No person shall be allowed to deepen holes that have previously contained explosives.

(w) All wires in broken ore or rock shall be carefully traced and search made for unexploded cartridges.

(x) Whenever blasting is being done in a mine at points liable to break through to where other men are at work, the foreman or person in charge shall, before any holes are loaded, give warning of danger to all persons that may be working where the blasts may break through, and he shall not allow any holes to be charged until warning is acknowledged and men are removed.

(y) Blasters, when testing circuit through charged holes, shall use sufficient leading wires to be at a safe distance, and shall use only approved types of galvanometers. No tests of circuits in charged holes shall be made until men are removed to safe distance.

(z) No blasts shall be fired with fuse in vertical or steep shafts from which men have to be hoisted to safety.

(aa) A daily record of all misfires shall be kept at the mine office, giving name of loading blaster and name of blaster that refired it.

Rule 1009. Hoisting Engineer

(a) It shall be the duty of every superintendent of every mine having a hoisting engine to appoint and designate one or more men, who shall be able to speak and read the English language readily, to be known as hoisting engineers. At all shafts where men are hoisted or lowered, such hoisting engineers shall be not less than twenty-one (21) years of age, and at shafts where men are not so hoisted or lowered, they shall be not less than eighteen (18) years of age. It shall be the duty of every superintendent to appoint as hoisting engineers men who are familiar with the details and working of a hoisting engine, and except in case of emergency, to permit no one other than such duly appointed hoisting engineers to run such engine or hoisting machinery; except that, by and with the consent of the superintendent, specified apprentices may be taught the operation of the hoisting engine at such times and under such restrictions as the superintendent may determine to be free of risk to life and limb.

(b) At every mine in which fifty (50) or more men per shift are to be hoisted or lowered at the beginning or ending of shift, there shall be with the hoisting engineer an extra man competent to operate the engine.

Rule 1010. Hoisting

(a) The superintendent of the mine shall establish for each shaft rates of speed for the cages, skips, buckets, or other conveyances that shall not be exceeded in the hoisting or lowering of men, and he shall post a notice of such limitation in a conspicuous place near each hoisting engine; such rates of speed shall not exceed the maximum approved by the Industrial Commission.

(b) The superintendent of the mine shall determine the maximum number of men that in his judgment may safely ride on each cage, skip, bucket, or other conveyance used in the mine under his supervision, and shall post in a conspicuous place near each shaft a notice stating the maximum number of persons so permitted to ride and forbidding the carrying of any greater number. At the beginning and ending of each shift the mine foreman or shift boss, or some other responsible person appointed by the superintendent, shall be stationed on the loading platforms or landing places of each shaft where men are to be hoisted and lowered, and shall prevent any greater number of men than that permitted by order of the superintendent to enter upon or into any cage, skip, bucket, or other conveyance, and shall remain at such stations until the last man about to ascend or descend the shaft shall have entered the cage, skip, bucket, or other conveyance. And at the end of the shift, the man in charge of work on each level of the mine from which men are to be hoisted shall post himself in the station of the shaft at that level, and shall prevent any greater number of men than the maximum permitted by the superintendent of the mine to enter upon or into any cage, skip, bucket, or other conveyance, and shall remain in this station until the last man to ascend shall have entered upon or into the cage, skip, bucket, or other conveyance. The number of persons permitted to ride, as determined by the superintendent, shall not exceed the maximum approved by the Industrial Commission.

(c) During such other times when men are hoisted or lowered by cage or other conveyance, except a bucket, such cage or other conveyance shall be operated under the charge of a person or persons appointed as conductors or starters, and no person other than these conductors or starters shall give any signal for the movement of the cage or other conveyance.

(d) In hoisting or lowering men with a bucket, the speed, except in the case of apprehended danger, shall not exceed two hundred (200) feet per minute when the bucket is within one hundred (100) feet of the surface, or five hundred (500) feet per minute in any other part of the shaft.

Rule 1011. Safeguards Against Overwinding

(a) For the purpose of safeguarding life, provision against overwinding, approved by the Industrial Commission, shall be installed.

(b) The operator of a mine shall install in every shaft through which more than fifty (50) men are hoisted per shift, by cage, skip or man car, a device which shall give a warning signal in the engine room whenever the cage or skip in ascending reaches a point not less than sixty (60) feet below the limit of travel of the cage or skip.

Rule 1012. Duties of Hoisting Engineer

(a) It shall be the duty of every hoisting engineer to keep a careful watch over his engine and over all machinery under his charge.

(b) He shall, while on duty, be in immediate charge of his engine, and shall not at any time delegate any of his duties to any other person, except to apprentices duly designated, as provided in these rules.

(c) He shall familiarize himself with and use the signal code posted in the engine room, as hereinafter provided.

(d) He shall not run his engine unless the same is properly provided with brakes, indicators, and distance marks on hoisting ropes or cables, as provided in these rules.

(e) It shall be the duty of the hoisting engineer to exclude every person from his engine-room, excepting any person or persons whose duties require their presence therein, and visitors authorized by the superintendent of the mine.

(f) He shall hold no conversation with anyone while his engine is in motion, or while attending to signals.

(g) He shall not hoist men out of, or lower men into, any mine or shaft at a speed greater than the rate posted in the engine-room.

(h) He shall inspect all hoisting machinery and safety appliances connected therewith, and shall report any defects found therein.

(i) After any stoppage of hoisting for repairs or for any other purpose exceeding in duration one hour, he shall run a bucket, skip, cage, or other conveyance, on which no men shall ride, up and down the working part of the shaft at least once, and shall not permit the bucket, skip, cage, or other conveyance to be used for hoisting or lowering men until the hoisting machinery and shaft shall have been found to be in safe condition.

(j) He shall do no hoisting in any compartment of a shaft while repairs are being made in the said hoisting compartment except such hoisting as may be necessary to make such repairs.

(k) He shall not turn over the charge of the engine to his relief at change of shift, or at any other time, while the bucket, skip, cage, or other conveyance is in motion.

Rule 1013. Hoisting Ropes

(a) No operator of any mine shall use any rope or cable for hoisting or lowering men when such hoisting or lowering is done by any means other than human or animal power, unless such rope or cable shall be composed of metal wires, with a factor of safety determined as hereinafter set forth; provided, however, that such metal wires may be laid around a hemp center.

(b) The factor of safety of all such ropes or cables shall in no case be less than five (5).

(c) No head or angle sheave of a diameter less than sixty (60) times the diameter of the rope shall be used for hoisting or lowering men.

(d) There shall not be used any rope or cable for the raising or lowering of men, either when the number of breaks in any consecutive ten (10) feet of said rope exceeds ten (10) per cent of the total number of wires composing the rope, or when the wires on the crown of the strands are worn down to less than sixty (60) per cent of their original area, or when the superficial inspection provided for in these rules shows marked signs of corrosion.

(e) All ropes used for hoisting or lowering men shall be thoroughly inspected once in every week by some competent person designated for the purpose by the superintendent. If upon any inspection, such hoisting rope or cable shall be found to be below the requirements set forth in these rules, it shall be discontinued for such purpose forthwith.

(f) Every rope used for hoisting or lowering men shall be securely fastened at both ends, and when in use shall never be fully unwound; at least two (2) full turns shall remain always on the drum or reel. The end of the rope attached to the conveyance in the shaft shall either be securely fastened within a tapered socket or else it shall be bound around an oval thimble and then fastened to itself by splicing or by the use of three or more clamps.

Rule 1014. Cages for Hoisting Men

In all shafts an iron bonneted safety cage shall be used for hoisting and lowering men; but this provision shall not apply to shafts in the process of sinking.

It shall be the duty of the operator to have all cages in which men are hoisted and lowered, used in such shafts, constructed as follows, or in a manner equally safe:— The bonnet shall be of two (2) steel plates not less than three-sixteenths (3/16) of an inch in thickness, sloping toward each side, and so arranged that they may be readily pushed upward to afford egress to persons therein, and such bonnet shall cover the top of the cage in such manner as to protect persons on the cage from objects falling in the shaft. The cage shall be provided with metal plate or wire mesh siding, not greater than two (2) inch mesh, the wires of which shall be not less than No. 8 U. S. standard gauge, and with gates either hung on hinges opening inwardly or working in slides; when men are being hoisted or lowered such gates shall be closed before the car is put in motion. Every cage shall be provided with an approved safety catch of sufficient strength to hold the cage or skip with its maximum load at any point in the shaft, in the event that the hoisting cable should break.

Rule 1015. Two (2) Openings to Surface

It shall be the duty of every operator of every mine, except as hereinafter provided, to maintain at least two (2) outlets to the surface from such mine, or an underground communicating passageway between such mine and some other mine, so that there shall be at all times at least two (2) distinct and available means of access to the surface to all persons employed in such mine. Such outlets shall not be less than two hundred (200) feet apart, and there shall be between them a space not less than one hundred (100) feet in width free of buildings or inflammable material.

Provided, however, that the above requirements shall not apply in the case of: (a) Shafts or mines in process of being connected, to comply with the terms of this rule; (b) Shafts, winzes, adit levels, tunnels, and drifts to prospect for and develop mineral substances, but not for the extraction of mineral substances, except such as may be extracted in the course of such prospecting and developing work; (c) Any mine in which one of the shafts or outlets shall have temporarily become unavailable for the persons employed in the mine, and in which every effort is being made by the operator of the mine to open such temporarily unavailable outlet, and provided the same is not, in the opinion of the Industrial Commission, dangerous to the life and health of those employed

therein; (d) mines having workings less than one hundred (100) feet deep and extending less than three hundred (300) feet from the shaft in any direction, but not mines opened primarily by an adit level or tunnel; and (e) mines opened by an adit level, tunnel or drift less than one thousand (1,000) feet in length; and provided, further, that mines opened by an inclined shaft of less than twenty (20) degrees angle from the horizontal shall be considered for the purpose of these rules as equivalent to a mine opened by an adit level, tunnel or drift.

Provided, further, that any prospecting or development, exempt under exception (b) from providing two (2) outlets to the surface, shall not permit more than twenty-five (25) men to work underground at any one time. The exemption granted under the provisions of subdivision (b) may be withdrawn by the Industrial Commission, when after investigation, it appears that the operation has extended beyond the prospecting or developing stage.

Provided, however, that in mines opened by adit levels, slopes, or both, the Industrial Commission may waive the requirements of this rule, when, after investigation by the Industrial Commission, existing conditions are, in its opinion, found to be such that the safety of the occupants would not be endangered thereby.

Rule 1016. Openings Through Other Mines

When a common communicating escapement outlet is established between mines, such outlet shall be maintained clear of obstruction to travel, and intervening doors, if any, shall be kept unlocked and ready at all times for immediate use.

In the event that escape by such communicating outlet be cut off, the owner or operator, upon whose property the secondary outlet is rendered unavailable, shall immediately notify the owner or operator of the adjoining mine and the Industrial Commission.

Rule 1017. Mines Having Only One Outlet

In every mine where, under the provisions of Rule 1015 of these rules, only one outlet is required, and where a single shaft affords the only means of ingress or egress to persons employed underground, such shaft shall be divided into at least two (2) compartments by solid partitions. One of said compartments shall be set aside for use as a ladderway and no hoisting conveyance shall be allowed therein. Whenever such shaft shall be covered by a non-fireproof building, it shall be the duty of the operator of said mine

to cause said ladderway to be securely bulkheaded at a point at least twenty-five (25) feet below the collar of the shaft; and below this bulkhead a passageway shall be driven to the surface so as to have its outlet in no case less than thirty (30) feet beyond the walls of the building covering the main shaft. The said passageway shall be equipped with a ladderway when necessary, as provided in Rule 1019 of these rules and shall be kept in good repair and shall afford an easy exit in the event of fire. Every mine opened by adit level or tunnel or by an inclined shaft or slope of less than twenty (20) degrees angle from the horizontal, which is less than one thousand (1,000) feet in length, shall have a similar side outlet, if covered by a non-fireproof building.

Rule 1018. Protection of Outlets Against Fire

It shall be unlawful for the operator of any mine after the passage of these rules to erect any combustible structure over the shaft, tunnel, or other mine opening, except open headframe necessary for hoisting from such shaft or other mine opening, and the hatch or door necessary for closing such shaft or other mine opening. Provided, however, that a housing of non-inflammable and fireproof material may be erected over any shaft, tunnel or other mine opening to protect the men working at such point.

It shall be the duty of every operator to provide every adit, tunnel, inclined shaft, or slope of less than twenty (20) degrees angle from the horizontal, the mouth of which is covered by a building or house of any kind, with a tightly-fitting door near the mouth of such adit, tunnel, inclined shaft, or slope of less than twenty (20) degrees angle from the horizontal that can be closed from outside of the building by a pull wire or cable.

Rule 1019. Ladders and Ladderways

It shall be the duty of the operator of every mine to provide in addition to any mechanical means of ingress and egress, at least one means of outlet for the miners by means of ladders from the lowest workings of the mine to the surface. Except in the case of swinging or extension ladders used for shaft sinking, all ladders and ladderways hereafter constructed shall be built as prescribed in the following rules:

(a) The distance between the centers of the rungs of a ladder shall not exceed fourteen (14) inches and shall not vary more than

one (1) inch in any one ladderway. The length of the ladder rungs (width of ladder) shall not be less than twelve (12) inches.

(b) The rungs of a ladder shall in no case be less than three (3) inches from the wall or other obstruction in the shaft or opening in which the ladder shall be used.

(c) Every main ladderway with an inclination of more than seventy (70) degrees from the horizontal, the distance between the top and bottom of which is more than fifty (50) feet, shall have substantial platforms at intervals of not more than thirty (30) feet, measured vertically. Where the inclination of any ladder or section of a ladder, in main ladderways, exceeds eighty (80) degrees from the horizontal, all ladder sections shall be placed at one and the same side of the main shaft, and shall be inclined in the same direction.

(d) All such platforms, except for an opening large enough to permit the passage of a man, shall be closely covered, or protected by railings.

(e) Ladders shall project at least three (3) feet above every platform in the ladderway and at least three (3) feet above the collar of the shaft, unless secure hand holds are fixed at such places.

(f) In ladderways, other than main ladderways, not exceeding fifty (50) feet in depth or height, ladders may be fixed vertically.

(g) Under no circumstances shall any ladder inclining backward from the vertical be installed.

(h) Ladderways shall be provided in all shafts steeper than thirty (30) degrees from the horizontal in the course of sinking to within such a distance from the bottom thereof as will secure them from damage by blasting. From the end of such ladderways, chain, wire rope or wooden extension ladders, or chains to reach to the bottom of the shaft shall be provided.

Rule 1020. Ventilation

The operator of every mine, whether operated by shaft, slope, tunnel, adit level, or drift, shall provide and maintain for every such mine a good and sufficient amount of ventilation for such men and animals as may be employed therein, and shall cause an adequate quantity of pure air to circulate through and into all the shafts, winzes, levels, and all the working places of such mine.

Note: It is strongly recommended that the recommendations as prepared by the Bureau of Mines from time to time be followed.

Rule 1021. Sanitation — Dry Closets, Drinking Water, Change Houses, Etc.

It shall be the duty of the operator of every mine, for the purpose of improving the sanitation thereof and preserving the health of those employed therein, to provide dry closets, water closets, chemical closets, or closet cars upon all main working levels, for the use of all men employed in the mine. At least one (1) such closet shall be provided for every twenty-five (25) men employed within the mine. Ready means of access to each such closet shall be provided by the operator. No closet shall be constructed without adequate provision for the effectual cleansing and removing of the contents thereof, which shall be removed and disposed of at least twice a week. It shall be the duty of the mine foreman to cause each dry closet to be supplied with some disinfectant or deodorizer to be sprinkled upon the contents thereof. It shall be the duty of all men employed within any mine where such closets are provided to use such closets exclusively when in the mine. Provided, however, that this rule shall not apply to any mine where the operator or superintendent prefers to permit the men to go to the surface, and requires the men so to do.

Every stable or other place underground used for the housing of mules, horses or other animals, shall be kept thoroughly cleaned and the waste contents thereof removed to the surface.

It shall also be the duty of the operator of every mine to provide a good quantity of drinking water for the use of all men employed in the mine, a supply of which shall be provided on each main working level, and it shall be the further duty of the superintendent to cause such supply of drinking water to be adequately protected from contamination.

The operator of every mine employing more than twenty-five (25) men underground, shall provide a wash and change house, and such wash and change house shall be adequately heated, lighted and with sufficient water supply of warm water available to the men, open at all reasonable hours, free of cost.

Rule 1022. Roof Inspection

In all mines where stoping is done by the opening of chambers, the roof thereof being supported only by the walls of the chambers, or by pillars, it shall be the duty of the superintendent of the mine to detail a competent man to make a frequent inspection of the roof of those parts of the mine where men are employed, and said man

so detailed shall be charged with the duty of dislodging any slabs of rocks or ore in said roof that have become loose. Until such dislodgment is effected, the floor of the stope immediately beneath such loose rock shall be fenced off or otherwise adequately guarded; provided, however, that it shall be the duty of every miner to care for the roof at his working place.

It shall also be the duty of the superintendent of the mine to cause frequent inspection to be made by a competent person, detailed for such purpose, of the roofs of stopes, inclined shafts, inclined winzes, and other workings, and of the sides of shafts and winzes when any of these are used as traveling ways, and of the roofs of all drifts, adit levels, tunnels and gangways. The roof of the working places and the passages traversed by the employees going to and from same shall be inspected daily and dangerous conditions shall be remedied.

Rule 1023. Safety Pillars

No stoping shall be done within twenty (20) feet of a shaft that is used for hoisting men or material. The Industrial Commission may waive the requirements of this rule, when after investigation by the Industrial Commission, existing conditions are, in its opinion, found to be such that the safety of the occupants would not be endangered thereby.

No stoping shall be done within ten (10) feet of the boundary line of a mining property, except on application to and permission by the Industrial Commission.

Rule 1024. Intoxicating Liquor Prohibited in Mines

No person shall, while under the influence of intoxicating liquor, enter any mine, or any of the buildings connected with the operation of the same, where miners or other workmen are employed, nor shall intoxicating liquors be brought into any such places.

Provided, however, that nothing herein contained shall prevent the carrying of any alcoholic spirits or other stimulants into such mine or buildings for the purpose of administering to anyone injured therein.

Rule 1025. Candles

(a) At all timbered stations where candles are kept burning, there shall be provided metal sconces of sufficient size to catch and hold drippings and dropping wicks.

(b) It shall be the duty of any person using a candle or other portable light in a mine or any part of a mine, to extinguish it before departing from the mine, unless the candle or other portable light is taken to the outer air.

Rule 1026. Cages

(a) No person shall ride upon any cage, skip or bucket that is loaded with tools, timber, powder, or other material, except for the purpose of assisting in passing such material through a shaft or incline, and then only after a special signal has been given.

(b) When tools, timber, or other materials are to be lowered or hoisted in a shaft, their ends, if projecting above the top of the bucket, skip or other vehicle, shall be securely fastened to the hoisting rope or to the upper part of the vehicle, and all tools, timbers, or other materials loaded upon a cage, shall be securely lashed before being lowered or hoisted; provided, however, that such tools or other materials may be placed without lashing in a closed box or in a mine car when lowered in a cage, or in a skip, or in a special tool bucket, when no tool projects above the edge thereof.

Rule 1027. Hoisting While Sinking Shaft

In no case shall a cage, skip or bucket or other vehicle be lowered directly to the bottom of the shaft, when men are working there, but such cage, skip, or bucket or other vehicle shall be stopped at least fifteen (15) feet above the bottom of such shaft until the signal to lower farther shall have been given to the hoisting engineer by one of the men at the bottom of the shaft.

Rule 1028. Deepening Shaft — Protection

During shaft-sinking operations, no other work in any other place in the shaft shall be executed, nor shall any material or tools be hoisted or lowered from or to any other place in the shaft while men are at work in the bottom of the shaft, unless the men so at work be protected from the danger of falling material by a securely constructed covering extending over the whole area of the shaft, sufficient closable openings being left in the covering for the passage of men and the bucket or other

conveyance used in the sinking operations, or by a substantial rock pentice.

Rule 1029. Whims

Whims in use at or in mines shall be provided with a suitable latch or locking device which shall prevent running back of the bucket or other conveyance.

Rule 1030. Crossheads

All vertical shafts more than one hundred (100) feet deep from which hoisting is done by means of a bucket, shall be provided with suitable guides, and in connection with the bucket, there shall be a crosshead traveling upon these guides. The height of the crosshead shall be equal to that of its width.

Rule 1031. Telephone System

In all mines in active operation, a telephone system must be established, equipped and maintained with stations readily and quickly accessible to the men on each working level, communicating with a station thereof on the surface of any such mine.

Rule 1032. Signals

(a) Every mine shall be provided with an efficient means of interchanging distinct and definite signals between the top of the shaft and the lowest level and the various intermediate levels from which hoisting is being done. There shall be provided and maintained two (2) separate systems of signaling, which shall be either electrical, pneumatic, or mechanical, or one such system supplemented by speaking tube or telephone.

(b) No person shall ride upon any bucket, cage, skip or other conveyance, unless proper signals have been given as prescribed in Rule 1033. No person shall knowingly interfere with or impede a signal, or damage a signal system, or give or cause to be given a wrong signal.

(c) The signal to move the cage, skip or bucket shall be given only when the same is at the level from which the signal is to be given.

Rule 1033. Signal Codes

(a) Three (3) months after the adoption of these rules, the following system or code of mine signal shall be used:

- 1 bell.— Stop if in motion, or hoist if not in motion.
- 2 bells.— Lower.
- 3 bells.— Men on, run very carefully.

(b) Additional signals to meet local conditions may be used, provided they are easily distinguishable and do not conflict with the above code.

(c) Flashlight signals, consisting of nine (9) flashes on the mine lighting circuit, indicating fire or flood or other danger, shall be established in all mines equipped with an electric lighting system.

(d) An easily legible copy of the above code, and of any special code adopted in any mine, shall be printed in letters at least one-half ($\frac{1}{2}$) inch high, on a board or metal plate not less than eighteen by eighteen (18x18) inches, and shall be securely posted in the engine room, at the collar of the shaft and at each level or station. The superintendent of the mine shall be responsible for the carrying out of this rule.

Rule 1034. Cleaning of Manways

The timbers in all vertical and inclined ladderways and manways in daily use shall be cleaned of all loose rock lodged upon them at least once in every twenty-four (24) hours. Manways in daily use shall be kept clear of obstructions.

Rule 1035. Fire Protection

In all heavily timbered stopes, it shall be the duty of the mine foremen to cause fire inspection to be made after each shift shall have left such stope. A fire map shall be maintained at the mine office, showing all air and water lines in the mine, and their dimensions, with the positions of all sumps, valves, hydrants and pumps, and such map shall be brought up to date at least every six (6) months.

Rule 1036. Timbering

For the purposes of this and the succeeding rules, the term "timbers" shall be held to include and mean all wood to be

used by the miner, or all steel or concrete material used in lieu of timber.

(a) Every shaft, incline, slope, adit, tunnel, level or drift, and any working place in the mine shall be, when necessary, kept securely timbered or protected to prevent injury to any person from falling material. It shall be the duty of the operator to carry out and enforce the provisions of this rule, but nothing contained herein shall be construed to relieve the miner from the duty of caring for his own working place, save as herein-after provided.

(b) It shall be the duty of the operator to see that all miners in the mine are supplied at all times with such timbers as are necessary to keep their working places in a safe condition, such timbers to be supplied at a point readily accessible and convenient to the working place.

(c) If for any cause, necessary timbers cannot be supplied to any miner when required, it shall be the duty of the mine foreman to instruct the miner or miners to vacate all such working places until supplied with the timbers needed, but nothing contained herein shall be construed to relieve the operator of the duty of supplying such timbers.

Rule 1037. Fencing Disused Workings

All abandoned shafts, shafts temporarily out of use, or shafts used only as airways, shall be securely covered or fenced, and shall be so maintained. All mill holes, glory holes and cavernous stopes opening to the surface shall be securely fenced, and shall be so maintained. All other abandoned excavations whereof the sides slope more than thirty (30) degrees from the horizontal, and whereof the depth is more than ten (10) feet, shall be securely fenced, but such fencing need be erected only at those places where such slope is in excess of thirty (30) degrees, and all such fencing shall be maintained in good condition.

Rule 1038. Lighting

(a) Stationary lights shall be provided during the working hours at all shaft stations during the time the same are in actual use, and also at all stations on the levels where hoisting or hauling is effected by means of machinery, and also at night at all places on the surface where work is being conducted.

(b) All places where hoisting, pumping or other machinery is erected and in the proximity of which persons are working or moving about shall be so lighted when the machine is in operation that the moving parts of such machine can be clearly distinguished.

Rule 1039. Places of Refuge

(a) Where mechanical haulage is employed, there shall be maintained at all times a clearance space of not less than two and one-half ($2\frac{1}{2}$) feet on one side of tramway. Where such space cannot be maintained, refuge places shall be provided at not more than sixty (60) foot intervals, which shall afford a clearance space not less than four (4) feet wide, five (5) feet high, and eight (8) feet long.

(b) Every such place of refuge shall be conspicuously marked and kept clear, and no refuse shall be placed therein, and no person shall in any way prevent access thereto.

Rule 1040. Protection Against Water

(a) When advancing toward a mine excavation that is suspected to be filled with water, the working place shall not exceed six (6) feet by eight (8) feet in cross section, and the bore holes shall be kept at least fifteen (15) feet in advance of the breast, and also, if necessary, in directions laterally from the course of the drive.

(b) In every mine where there is danger from a sudden inburst of water, such additional raises, drifts, or other workings shall be constructed as are necessary to insure the escape of workmen from the lower workings.

Rule 1041. Sumps

All sumps shall be securely covered or fenced, except when being cleaned or repaired.

Rule 1042. Stopes

In stopes timbered with square sets, the working floors shall be closely and securely lagged over. Openings in the floors shall be protected by railings.

Rule 1043. Winzes or Raises

Winzes opening directly from the floor of a drift or stope shall be kept covered by a substantial hatch, or shall be planked

over, except when in use, or shall be barred off by a substantial railing not less than three and one-half ($3\frac{1}{2}$) feet nor more than four (4) feet above the level of the floor, or shall be provided with a gangway not less than ten (10) inches wide, which gangway shall have a substantial hand-railing not less than three and one-half ($3\frac{1}{2}$) feet nor more than four (4) feet above the gangway, and the approaches to such gangway at each end shall be protected by a substantial railing not less than three and one-half ($3\frac{1}{2}$) feet nor more than four (4) feet above the floor.

Raises for shaft extensions and for stopes steeper than fifty (50) degrees shall be done by two (2) compartments, in one of which there shall be a protected ladderway.

Rule 1044. Protection to Drifts

Drifts used as manways intersecting overhead workings through which material is dropped, shall be closed to the passage of persons by a substantial rail not less than three and one-half ($3\frac{1}{2}$) feet nor more than four (4) feet in height above the level of the drift, on each side of the working, whenever material is to be dropped through such working, and the drift shall be kept so closed during periods when the working is so in use.

Rule 1045. Shaft Protection

(a) At all shaft stations a gate or a guard rail not less than three and one-half ($3\frac{1}{2}$) feet nor more than four (4) feet above the floor shall be provided and kept in place across the shaft, except when the cage, skip, bucket, or other conveyance is being loaded or unloaded thereat, but this prohibition shall not forbid the temporary removal of the gate or rail for the purpose of repairs or other operations, if proper precaution to prevent danger to persons be taken.

(b) The top of all shafts shall be protected by a tight fence, which may be provided with the necessary gates to give access to the shaft, but such gates shall be kept closed when access to the shaft is not necessary.

(c) If hoisting be done from greater depth than twenty-five (25) feet by means of a bucket, shaft doors shall be installed that will prevent any material from falling into the shaft while

the bucket is being dumped, and such doors shall be closed while the bucket is being dumped.

(d) All stations or levels shall have such a passageway through or around the working shaft that crossing through the hoisting compartment may be avoided; entering or crossing the hoisting compartment of a shaft, except to ascend or descend, or for the purpose of effecting repairs is prohibited; before repairs are commenced the person in charge of or directing the repairs shall inform the hoisting engineer of the nature thereof.

Rule 1046. Safety Catches

The safety catches of cages shall be kept well oiled and in good working order, and shall be tested at least once a month. Such test shall consist of releasing the cage suddenly in some suitable manner so that the safety catches shall have opportunity to grip the guides.

Rule 1047. Mechanical Haulage

When mechanical haulage is used and through passageways and approaches to working places, no greater speed shall be made than the Industrial Commission will permit. No cars shall be pushed ahead of the locomotive underground where it is practicable to draw. Head lights shall be placed on the front of first car or locomotive of a moving train. All trolleys shall be trailed. No locomotive shall be driven by a person under twenty-one (21) years of age. No gas locomotive shall be used in any mine without the written consent of the Industrial Commission.

ELECTRICAL EQUIPMENT

Rule 1048. Definitions

(a) Potential and Voltage. The terms "potential" and "voltage" are synonymous and mean electrical pressure.

(b) Difference of Potential. The expression "difference of potential" means the difference of electrical pressure existing between any two points of an electrical system or between any point of such a system and the earth as determined by a voltmeter.

(c) Potential of a Circuit. The potential or voltage of a circuit, machine or any piece of electrical apparatus is the potential

normally existing between the conductors of such circuit or the terminals of such machine or apparatus.

(d) Where the conditions of the supply of electricity are such that the difference of potential between any two points of the circuit cannot exceed three hundred (300) volts, the supply shall be deemed a low-voltage supply.

(e) Where the conditions of the supply of electricity are such that the difference of potential between any two points of the circuit may at any time exceed three hundred (300) volts, but cannot exceed six hundred fifty (650) volts, the supply shall be deemed a medium-voltage supply.

(f) Where the conditions of the supply of electricity are such that the difference of potential between any two points of the circuit may at any time exceed six hundred fifty (650) volts, the supply shall be deemed a high-voltage supply.

(g) Grounding. Grounding any part of an electrical system shall consist in so connecting such part to the earth that there shall be no material difference of potential between such part and the earth.

(h) Underground Station. The term "underground station," as used herein, shall mean any place where electrical machinery is permanently installed in the mine.

(i) The term "carrying capacity" shall be taken to mean carrying capacity of a given wire as prescribed for various insulated wires in the National Electrical Code, published by the National Board of Fire Underwriters, and the United States Bureau of Mines' standard for bare wires.

Rule 1049. Care of Equipment and Practices

(a) No person shall, without authority, install or handle electric wires, lights, conductors, or electrical apparatus of any kind, or enter an electrical machine room or underground station.

(b) No person shall be allowed to work on or with electrically-driven apparatus, unless he shall have been previously instructed in the performance of his duties by a competent person, and shall have been duly authorized by the mine superintendent or mine foreman.

(c) Instruction for the disengaging of persons from contact with live wires and the resuscitation of persons suffering from electric shock shall be posted at the entrance to the mine, in

every generating station and substation, and in all underground electric stations. All employees working with electrical apparatus shall be required by the mine superintendent to familiarize themselves with these instructions, and shall be capable of applying them before entering upon such work.

Rule 1050. Grounding

The frames and bed plates of generators, transformers, compensators, rheostats, and motors installed underground, shall be effectively grounded. All metallic coverings, armoring of cables, other than trailing cables, and the neutral wire of three-wire systems shall also be so grounded.

Rule 1051. Voltage

In electrical systems hereafter installed, no higher voltage than low voltage shall be used underground, except for transmission or for application to transformers, motors, generators, or other apparatus in which the whole of the medium or high voltage apparatus is stationary.

Rule 1052. Switchboards

Switchboards shall consist of a substantial framework of iron pipes, angle irons, or bar iron, on which shall be mounted a panel or panels of incombustible, non-absorbent insulating material that is mechanically strong and has insulating qualities suitable for the voltage at which it is used.

The panels of insulating material may be omitted if each piece of equipment carried on the switchboard is provided with an individual base of insulating material of the character specified for the panels and of adequate dimensions, or has its current-carrying parts mounted on similar insulation self-contained in the equipment, which shall be especially designed for mounting on iron pipe, angle-iron, or bar-iron frameworks.

Rule 1053. Danger Signals

All medium and high-voltage machines and apparatus shall be conspicuously marked by the use of the word "danger," and shall be properly illuminated when in circuit.

Rule 1054. Fire Buckets

Buckets filled with clean, dry sand shall be kept in all underground electrical stations ready for immediate use in extinguishing fires. The minimum quantity of sand thus stored in any one station shall be two (2) cubic feet; provided that a fire extinguisher of character approved for the purpose may be kept instead of the sand.

Rule 1055. Emergency Lights

Lamps or other proper lights shall be kept ready for use in all underground stations where a failure of electric light is likely to cause danger.

Rule 1056. Plan of Electric Systems

The operator of every mine where electrical equipment is installed underground shall make or cause to be made by a competent person, a clear and accurate plan or sketch with distances marked, showing the position of all stationary electrical apparatus in connection with the mine, in excess of twenty-five (25) kilowatts' capacity, including fixed cables, conductors, lights, switches and trolley lines. The capacity in horsepower of each motor and in kilowatts of each generator or transformer, and the nature of its use, shall be shown on such plan or sketch. This plan or sketch shall be kept at the mine and shall be corrected and be brought up to date at intervals not exceeding six (6) months, and shall at all times be subject to examination by the Industrial Commission.

Rule 1057. Underground Stations and Transformer Rooms

(a) Switchboards. All switches, circuit breakers, rheostats, fuses and measuring instruments used in connection with underground motor generators, rotary converters, transformers and motors, shall be mounted on standard bases of non-combustible and insulating material, but in no case shall primary instruments be used on circuits of more than three hundred (300) volts. This provision shall not apply to compensators for induction motors. The above mentioned switches, circuit breakers, rheostats, fuses, and instruments may be mounted on a common base, provided such base is of non-combustible, insulating material.

(b) Passageways. A passageway not less than three (3) feet in width shall be maintained in front of all switchboards. No one shall be permitted back of the switchboards while the current is on.

(c) Space back of Switchboards. Any space over thirty (30) inches wide at the back of switchboards, shall be accessible from each end, and shall be kept locked up in case of medium and high-voltage boards, but no lock shall be used that will not permit the door being opened from the inside without the use of a key. In no case shall this space be used as a change room, wardrobe or for the storage of material. Non-combustible flooring only shall be used at the front and back of high-voltage boards, and insulating mats or their equivalent shall be provided in front and back of all boards, whatever the voltage.

(d) Conductors Crossing Passageway. No electric conductor shall cross a passageway at the back of a switchboard except below the floor, or at a height of not less than seven (7) feet above the level of the floor.

(e) Live Metal Work on Switchboards. No live metal work shall be placed on the front of high-voltage switchboard within seven (7) feet of the floor.

(f) Protection of Terminals. All exposed terminals on underground machines shall be protected with properly designed insulating covers of suitable material, or with metal covers connected to earth.

(g) Transformer Rooms. Transformer rooms shall be properly lighted, shall be of fireproof construction, and if of conductive material shall be effectively grounded.

(h) Circuits Entering or Leaving all Transformers. Circuits leaving the transformer shall be protected by a switch and an automatic circuit breaker to interrupt current, but fuses may be substituted for the circuit breakers in the case of lighting circuits, and in the case of power circuits transmitting twenty-five (25) kilowatts or less. Primary fuses and disconnecting switches shall be placed in the primary circuit ahead of the transformers, but in no case shall these disconnecting switches be opened or closed under load.

Rule 1058. High-Voltage Wires

All high-voltage wires installed underground after these rules are adopted, shall be in the form of insulated lead-covered cables, which

shall be armored or effectively protected against abrasion, but the armor shall be electrically continuous throughout and shall be effectively grounded. The installation of efficiently insulated wires in metal conduit to transmit power underground, shall be considered to meet this requirement.

Rule 1059. Support of Cables and Wires

(a) All underground cables and wires, unless provided with grounded metallic covering, shall be supported by efficient insulators. The conductors connecting lamps to the power supply shall in all cases be insulated.

(b) Cables and wires unprovided with metallic coverings shall not be fixed to walls or timbers by means of uninsulated fastenings.

Rule 1060. Overhead Lines Above Ground

Overhead transmission lines between the generating station or substation and the mine entrance, shall be supported upon insulators, which shall be adequate in quality, size and design for the voltage transmitted. Where such line is more than five hundred (500) feet in length, lightning arresters shall be installed in connection therewith at the entrance to the mine. Such line, except in the case of trolley wires, shall be maintained not less than ten (10) feet above the ground at the lowest point, except at the point of entrance to the mine.

Rule 1061. Buried Cables

Buried cables shall be continuously insulated, and protected by a metallic sheath, preferably lead; and where they are so located that there is a possibility of danger to the sheath by puncturing, such cables shall be further protected by armor.

Rule 1062. Protection of Circuits Leading Underground

(a) Every completely insulated feeder circuit in excess of twenty-four (24) kilowatt capacity, leading underground, where the potential does not exceed the limits of a medium-voltage potential, shall be provided above ground with a switch and an automatic overload circuit breaker. In the case of ground-return direct current circuits, a switch and current breaker shall be installed in the ungrounded side of the circuit, but may be omitted from the return side. Fuses may be substituted for circuit breakers in circuits transmitting twenty-five (25) kilowatts or less.

(b) Every high-voltage alternating-current feeder circuit leading underground shall be provided above ground with an oil break switch on each phase, and every such switch shall be equipped with an automatic overload trip.

Rule 1063. Branch Circuits

Every branch circuit shall be provided with a switch of ample carrying capacity, on each phase, within fifty (50) feet of the point where it leaves the main circuit.

Rule 1064. Lighting Circuits

Wires for all lighting circuits shall be covered with an insulation adequate for the voltage of the circuit, and, unless encased in pipes or other metallic covering, shall be strung on porcelain or glass insulators. Separate uncased wires shall be kept at least three (3) inches apart, except where they enter the fittings. Metallic casings, if used, shall be efficiently grounded.

Rule 1065. Underground Trolley

Trolley wires shall be securely supported upon hangers efficiently insulated, and placed at such intervals that the sage between points of support shall not exceed three (3) inches.

Rule 1066. Protection of Trolley Wires

(a) At all places where men are required to work or pass regularly under trolley or other bare power wires which are placed less than six and one-half ($6\frac{1}{2}$) feet above top of rail, a suitable protection shall be provided, which may consist of channeling the roof or of placing boards along the wire, which shall extend three (3) inches below it, or in the use of any other device that will afford ample protection. In new installations the trolley wires shall be protected as provided for above, unless the wire is at least seven (7) feet above top of rail. At all points where timbers or tools have to be unloaded or transferred up a raise, the trolley wires shall be boxed or otherwise protected as provided for in this paragraph. All places where it is required that the trolley wires shall be boxed, shall be well-lighted with electric lamps.

(b) All wires, except telephone, shot-firing and signal wires, shall be boxed or otherwise guarded, where timbers or tools have to be transported.

Rule 1067. Power Wires and Cables in Shafts

In all shafts, the angle of inclination of which is above forty-five (45) degrees from the horizontal, and in all hoisting shafts or man-way compartments, all power wires and cables shall be amply protected by insulation and substantially fixed in position. All shaft cables shall be supported on insulators that cannot cause abrasion of the covering or insulation, so spaced that no part of the cable shall be under a tension greater than one-fourth ($\frac{1}{4}$) of its ultimate strength. The cable shall be held in position at points between the insulators by grips or cleats that cannot cause abrasion of the covering or insulation. Where the cables are not completely boxed in and protected from falling material, space shall be left between them and the side of the shaft so that they may yield and lessen a blow from falling material. This rule shall not be construed to prevent the installation of efficiently insulated wires in metal conduit, to transmit power underground.

Rule 1068. Cables in Main Roads

Where the cables or feed wires in main roads cannot be kept at least twelve (12) inches from any part of the mine car or locomotive, they shall be especially protected by proper guards.

Rule 1069. Protection of Cables During Blasting

Cables shall be temporarily protected against damage at any point where workings are being repaired or where blasting is being carried on.

Rule 1070. Cables Entering Fittings

(a) The exposed ends of cables where they enter fittings of any description shall be so protected and finished off, that moisture cannot enter the cable, or the insulating material leak out, if of an oily or viscous nature.

(b) Where unarmored cables or wires pass through metal frames or into boxes or motor casings, the holes shall be substantially lined with insulated bushings.

Rule 1071. Joints in Conductors

All joints in conductors shall be mechanically and electrically efficient, and shall be soldered wherever necessary. All joints in insulated wire shall, after the joint is complete, be reinsulated to the same extent as the remainder of the wire.

Rule 1072. Joints in Cables

Where cables are joined, suitable junction boxes shall be used, or the joints shall be soldered, and the insulation, armoring, or lead covering, replaced in as good condition as it was originally.

Rule 1073. Fuses, Circuit Breakers and Switches

(a) Fuses and automatic circuit breakers shall be constructed so as effectually to interrupt the current when a short circuit occurs or when the current through them exceeds a pre-determined value. No open type or link fuses shall be used.

(b) All points at which a circuit has to be made or broken shall be provided with proper switches, which shall be so installed that they cannot be closed by gravity.

(c) Fuses shall be stamped or marked, or shall have a label attached, indicating the maximum current that they are intended to carry. Fuses shall be adjusted or replaced only by an authorized and competent person.

(d) The capacity of fuses used to protect feeders shall not exceed the current capacity of the feeder by more than twenty-five (25) per cent.

(e) All switches, circuit breakers, and fuses shall have non-combustible bases.

Rule 1074. Stationary Motors

Every stationary motor and every portable motor underground, together with its starting device, shall be protected by a fuse on each phase, or (in the case of motors of more than forty (40) horsepower) by a circuit breaking device on at least one phase of direct current motors and on each phase of alternating current motors, and by switches arranged to cut off entirely the power from the motor. The above devices shall be installed in a convenient position near the motor and in sight of it.

Rule 1075. Electric Lighting

(a) Lamp Sockets. The exterior of the sockets of all fixed incandescent lamps, installed after these rules go into effect, shall be entirely non-metallic.

(b) Flexible Lamp Cord. The use of flexible lamp cord for lighting connections is prohibited, except for portable incandescent lights to be used in connection with the inspection and repair of

machinery and equipment, and in that case the cord shall have extra heavy insulation. Such portable lights shall be protected by a wire cage large enough to inclose both lamp and socket, and shall be provided with a handle to which the light and socket shall be firmly attached and through which the leading-in wires shall be carried.

(c) Incandescent Lamps. Incandescent lamps shall be so placed that they cannot come into contact with combustible material; and shall be so placed that an adequate circulation of air may take place on all sides of them.

Rule 1076. Duties of Employees

Every employee shall be responsible for carrying out all rules which immediately concern or affect his conduct.

Penalties

Section 1275 of the Penal Law:

Any person who violates or does not comply with any provision of the Labor Law, any provision of the Industrial Code, any rules or regulation of the Industrial Board of the Department of Labor or any lawful order of the Commissioner of Labor * * * is guilty of a misdemeanor and upon conviction shall be punished, except as in this chapter otherwise provided, for a first offense by a fine of not less than twenty nor more than fifty dollars; for a second offense by a fine of not less than fifty nor more than two hundred and fifty dollars, or by imprisonment for not more than thirty days or by both such fine and imprisonment; for a third offense by a fine of not less than two hundred and fifty dollars, or by imprisonment for not more than sixty days, or by both such fine and imprisonment.

RULES AND REGULATIONS RELATING TO QUARRIES

Law, Section 119. Protection of employees in mines, tunnels and quarries.—Every necessary precaution shall be taken to insure the safety and health of employees employed in the mines and quarries and in the construction of tunnels in the state. The industrial board shall have the power to adopt rules and regulations to carry into effect the provisions of this article and may amend or repeal rules and regulations heretofore prescribed by the commissioner of labor under the provisions of this article. The rules and regulations heretofore prescribed by the commissioner of labor under this article shall continue in force until amended or repealed by the industrial board.

Rule 1100. Definitions of Terms

(a) Application. These rules shall apply to all quarries in the State of New York producing minerals within the meaning of that term, as hereinafter defined.

(b) Singular and plural numbers. For the purpose of these rules, the singular number when used in reference to persons, acts, objects, and things of whatsoever kind and description, shall, whenever the context will permit, be taken and held to import and include the plural number, and the plural number shall similarly be taken and held to import and include the singular.

(c) The term "quarry" shall include excavations, prospect openings, pits, banks and open cut workings employing an average of five (5) or more men, and shall embrace any and all parts of the property of such quarry and quarrying plant that contribute directly or indirectly to the quarrying of minerals. Provided, that when a group of workings in proximity to one another and under one management are administered as distinct units, each working shall be considered a separate quarry.

(d) Mineral. The term "mineral" shall mean whatever is recognized by the standard authorities as mineral, whether metaliferous or non-metaliferous, but shall not be held to embrace or include coal, lignite, gas, oil, or any substances when extracted in solution or in the molten state through bore holes.

(e) Operator. The term "operator" shall mean the person, firm or body corporate in immediate possession of any quarry and its accessories as owner or lessee thereof, and as such responsible for the condition and management thereof.

(f) Superintendent. The term "superintendent" shall mean the person having immediate supervision of the quarry.

(g) Quarry Foreman. The term "quarry foreman" shall mean a person who at any time is charged with the general direction of the quarry work.

(h) Explosive. The term "explosive" or "explosives" shall be held to mean and to include any chemical compound or any mixture that contains any oxidizing and combustible units or other ingredients in such proportions, quantities or packing that an ignition by fire, by friction, by concussion, by percussion, or by detonation of any part of the compound or mixture may cause such a sudden generation of highly heated gases that the resultant gaseous pressures are capable of producing destructive effects on contiguous objects or of destroying life and limb.

(i) Magazine. The term "magazine," as used in these rules, shall be held to mean and include any building or other structure or place in which explosives are stored or kept, whether above or below ground.

(j) Person. The term "person" shall be held to mean and include a firm or body corporate as well as natural persons.

(k) Employees. The terms "employees" and "men employed" shall be held to mean all men receiving compensation from the operator, directly or indirectly, for labor or services performed in connection with the quarries.

(l) Approved. The term "approved" shall be held to mean approved by the Industrial Commission.

Rule 1101. General

(a) The operator and superintendent of every quarry shall use every reasonable precaution to insure the safety of the workmen in the quarry in all cases, whether provided for in these rules or not.

(b) All defects in or damage or injury to machinery or timbering or to apparatus and equipment generally in and about a quarry, all unsafe or dangerous conditions in any part of the quarry, and all accidents occurring in the course of quarrying operations, other than those of a purely minor character, even though not resulting in per-

sonal injury, shall be promptly reported to the quarry foreman or superintendent by the person observing the same.

(c) Wages shall not be paid on any premises used for the sale of intoxicating liquors.

(d) Each workman employed in the quarry, when first engaged, shall have his attention directed to the general and special rules provided for in these rules.

Rule 1102. Superintendent

The operator of every quarry shall appoint a man who shall be personally in charge of the quarry and the performance of the work done therein, who shall be designated as the "superintendent;" provided, however, that nothing herein contained shall prevent the owner or operator of any quarry from personally filling the office of superintendent.

The superintendent of every quarry shall inspect or cause some competent person or persons appointed by him to inspect all quarrying appliances, boilers, engines, magazines, explosives, bell ropes, speaking tubes, telephones, tracks, ladders, dry closets, and all parts and appliances of said quarry in actual use, and any such person or persons appointed by the said superintendent shall at once report any defects therein to the superintendent. It shall be the duty of the superintendent upon ascertaining such defects to take immediate steps to remedy the same so as to make the same comply with the provisions of these rules, and he shall forthwith notify the operator of said quarry of the existence of such defects. It shall be the duty of the superintendent to appoint a competent man to have full charge, under the direction of said superintendent, of every magazine containing explosives situated on said quarrying property, and to make such other appointments and perform such other duties as are provided by these rules to be performed by such superintendent.

Rule 1103. Care of Injured

It shall be the duty of operators, superintendent, or anyone in charge of any quarry to keep at such place about the quarry as may be designated by the Industrial Commission, a stretcher, a woolen blanket and a waterproof blanket in good condition for use in carrying any person who may be injured at the quarry. Where more than one hundred (100) persons are employed two (2) stretchers, two (2) woolen blankets and two (2)

waterproof blankets shall be kept. At all quarries an adequate supply of materials shall be kept readily accessible for the treatment of anyone injured and shall include the following in suitable quantity: First-aid outfits consisting of one extra long gauze bandage with compress sewed in its center, one triangular bandage with methods of application printed thereon, two safety pins, and one card of instructions; large first-aid dressings for wounds; packages of sterilized gauze; assorted bandages; United States Army tourniquet; carbolated vaseline or boric acid ointment; packages of picric acid gauze; wooden or wire-gauze splints; packages of absorbent cotton; safety pins; shears; tweezers; aromatic spirits of ammonia; paper cups; first-aid book of instructions; soap; basins; towels. Furthermore, in all quarries where one hundred (100) or more men are employed, a first-aid corps shall be organized, consisting of the foreman or foremen, shift bosses, time-keepers, or other employees designated by the superintendent; and it shall be the duty of the operator or superintendent to cause the organization of such employees and to procure the services of a competent person to instruct the members of such first-aid corps from time to time, not less than once in every three (3) months, in the proper handling and treatment of injured persons before the arrival of a physician; except that where a hospital is maintained in connection with a quarry, there shall be provided only such first-aid equipment as may be reasonably necessary to prepare the injured employee for removal to the hospital.

EXPLOSIVES

Rule 1104. Storage of Explosives

(a) The daily supply of explosives in a quarry shall be kept in a stout, tight box with hinged lids, which shall be kept securely locked, except at such times as explosives are being placed therein or removed therefrom, from which explosives shall be removed only as required for immediate use by the authorized blaster.

(b) No detonators shall be taken into any magazine containing other explosives. No fuses shall be capped with detonators in any magazine or in any other place where detonators or other explosives are stored, but special benches shall be provided at least twenty (20) feet from such storage places, where all fuses shall be capped. Cap crimpers shall be furnished in sufficient quantity to avoid the necessity of crimping in any other way.

No detonator shall be transported with other explosives, except when made into a primer with such other explosive.

(c) All magazines shall be bullet-proof.

(d) When supplies of explosives or fuse are removed from a magazine, those that have been longest in the magazine shall be taken first. Packages of explosives shall be removed to a safe distance from the magazine before being opened, and no such packages shall be opened with any metallic instrument.

Rule 1105. Marking of Explosives, Detonators and Fuses

It shall be unlawful for the operator or superintendent of any quarry to permit the use within such quarry of any explosive, or any blasting caps or detonators, or fuse, unless there shall be printed or marked on every original package containing explosives, the name and place of business of the manufacturer of such explosive, the date of its manufacture (if the date of manufacture is in code, the key to such code shall be furnished on application), and its character and grade; and on every original package containing such fuse, the name and place of business of the manufacturer of such fuse, and the date of its manufacture (if the date of manufacture is in code, the key to such code shall be furnished on application); and on every original package containing blasting caps or detonators, the name and place of business of the manufacturer of such blasting caps or detonators, the date of their manufacture (if the date of manufacture is in code, the key to such code shall be furnished on application), and their grade.

In emergencies, or when approved by the Commission, one manufacturer may supply explosives for another manufacturer, under the latter's brand.

It is recommended that employers provide common or safety fuse of uniform speed, preferably ninety (90) seconds per yard.

Rule 1106. Conveying, Thawing, Blasting, Misfires, Etc.

(a) The superintendent in all quarries shall appoint a sufficient number of experienced blasters to handle explosives and to do blasting.

(b) All foremen and gang bosses shall be experienced blasters and shall supervise the handling of explosives and see that blasting operations are carried on in accordance with the rules and regulations herein prescribed.

(c) Detonators shall not be carried with other explosives, nor shall any person ride in the same cage, skip or car with explosives.

(d) No blaster shall attempt to use any dynamite that is frozen, nor detonators of less than No. 6 strength.

(e) No quantity greater than is sufficient for daily use shall be artificially thawed at one time.

(f) Only approved methods of thawing shall be permitted.

(g) Fuse may be kept with detonators and all crimping of caps on fuse shall be done with proper crimper and at least twenty (20) feet away from explosives.

(h) No tools or other articles shall be kept with the explosives or with the detonators, except that the detonator chest may contain one or more crimpers, and the explosive chest may contain a hard wood wedge and mallet.

(i) All drill holes shall be of sufficient bore to admit of the free insertion to the bottom of the hole of a cartridge of explosive without ramming or removing the dynamite from its original wrapper, except for block holes.

(j) Fuse shall not be laced through cartridges for forming a primer.

(k) Foreman or shift boss shall before drilling is commenced on any shift, ascertain whether all holes fired on the previous shift have been exploded, and shall cause all remaining holes to be examined with a wooden stick for unexploded charges or cartridges, and if any are found, same shall be refired or a new hole drilled and fired before regular drilling is commenced.

(l) Explosives shall not be extracted from a hole which has once been charged; the tamping only may be withdrawn sufficiently to allow a missed shot being fired by insertion of fresh additional charge of primer.

(m) Blaster shall be furnished with hard wood rods for tamping and he shall not tamp or load any hole with a metal bar, nor shall the wooden rod have any metal parts; except that where black powder with no detonator is used, tamping will be permitted with a copper-tipped tamping rod.

(n) Firing shall be done by safety fuse or approved battery or from an electric current of not over two hundred and fifty (250) volts, provided a suitable switch is used, as hereinafter described. Other methods of firing may be permitted upon application and approval by the Industrial Commission.

(o) When firing by electricity from power or lighting wires in any quarry, a proper switch shall be furnished with lever down when "off." The switch shall be fixed in a locked box to which no person shall have access except the blaster. The lead wires shall be furnished with plugs and shall not be connected with the switch till ready to fire. After blasting, the switch lever shall be pulled out, the wires disconnected, and the box locked before any person shall be allowed to return, and shall remain so locked until again ready to blast.

(p) All power lines and electric light wires shall be disconnected at a point outside the blasting switch before explosives are taken in and loading of holes is proceeded with. No current by grounding of power or lighting wires or banded rails shall be allowed beyond blasting switch after explosives are taken in preparatory to blasting, and under no circumstances shall grounded current be used for exploding blasts.

(q) The blaster shall cause a sufficient warning to be sounded and shall be responsible that all persons retreat to safe shelter before he sets off blast, and shall also see that none return until he reports it safe for them. He shall report to the quarry foreman and furnish names of all persons refusing to obey his caution. Suitable and convenient shelters shall be provided.

(r) When a blaster fires a round of holes, he shall count the number of shots exploding, except in case of instantaneous blasting by electricity. If there are any misfires, he shall report the same to the gang boss or foreman. The blaster shall not leave until he has placed a wooden plug painted red, or other proper danger signal, in the mouth of the missed hole. If a missed hole has not been fired at the end of a shift, that fact, together with the position of the hole, shall be reported by the quarry foreman or shift boss to the quarry foreman or shift boss in charge of the next relay of quarrymen, before work is commenced by them.

(s) No person shall be allowed to deepen holes that have previously contained explosives.

(t) All wires in broken ore or rock shall be carefully traced and search made for unexploded cartridges.

(u) Whenever blasting is being done at points liable to break through to where other men are at work, the foreman or person in charge shall, before any holes are loaded, give warning of danger to all persons that may be working where the blasts

may break through, and he shall not allow any holes to be charged until warning is acknowledged and men are removed.

(v) Blasters, when testing circuit through charged holes, shall use sufficient leading wires to be at a safe distance, and shall use only approved types of galvanometers. No tests of circuits in charged holes shall be made until men are removed to safe distance.

(w) A daily record of all misfires shall be kept at the quarry office, giving name of loading blaster and name of blaster that refired it.

Rule 1107. Intoxicating Liquor Prohibited in Quarries

No person shall, while under the influence of intoxicating liquor, enter any quarry, or any of the buildings connected with the operation of the same, where quarrymen or other workmen are employed, nor shall intoxicating liquors be brought into any such places.

Provided, however, that nothing herein contained shall prevent the carrying of any alcoholic spirits or other stimulants into such quarry or buildings for the purpose of administering to anyone injured therein.

ELECTRICAL EQUIPMENT

Rule 1108. Definitions

(a) Potential and Voltage. The terms "potential" and "voltage" are synonymous and mean electrical pressure.

(b) Difference of Potential. The expression "difference of potential" means the difference of electrical pressure existing between any two points of an electrical system or between any point of such a system and the earth as determined by a voltmeter.

(c) Potential of a Circuit. The potential or voltage of a circuit, machine or any piece of electrical apparatus is the potential normally existing between the conductors of such circuit or the terminals of such machine or apparatus.

(d) Where the conditions of the supply of electricity are such that the difference of potential between any two points of the circuit cannot exceed three hundred (300) volts, the supply shall be deemed a low-voltage supply.

(e) Where the conditions of the supply of electricity are such that the difference of potential between any two points of the circuit may at any time exceed three hundred (300) volts, but cannot exceed six hundred fifty (650) volts, the supply shall be deemed a medium-voltage supply.

(f) Where the conditions of the supply of electricity are such that the difference of potential between any two points of the circuit may at any time exceed six hundred fifty (650) volts, the supply shall be deemed a high-voltage supply.

(g) Grounding. Grounding any part of an electrical system shall consist in so connecting such part to the earth that there shall be no material difference of potential between such part and the earth.

(h) The term "carrying capacity" shall be taken to mean carrying capacity of a given wire as prescribed for various insulated wires in the National Electrical Code, published by the National Board of Fire Underwriters, and the United States Bureau of Mines' standard for bare wires.

Rule 1109. Care of Equipment and Practices

(a) No person shall, without authority, install or handle electric wires, lights, conductors, or electrical apparatus of any kind, or enter an electrical machine room.

(b) No person shall be allowed to work on or with electrically-driven apparatus, unless he shall have been previously instructed in the performance of his duties by a competent person and shall have been duly authorized by the quarry superintendent or quarry foreman.

(c) Instruction for the disengaging of persons from contact with live wires and the resuscitation of persons suffering from electric shock shall be posted in every generating station and substation. All employees working with electrical apparatus shall be required by the quarry superintendent to familiarize themselves with these instructions, and shall be capable of applying them before entering upon such work.

Rule 1110. Grounding

The frames and bed plates of generators, transformers, compensators, rheostats, and motors, shall be effectively grounded. All metallic coverings, armoring of cables, other than trailing cables, and the neutral wire of three-wire systems shall also be grounded.

Rule 1111. Switchboards

Switchboards shall consist of a substantial framework of iron pipes, angle irons, or bar iron, on which shall be mounted a panel or panels of incombustible, non-absorbent insulating material that is mechanically strong and has insulating qualities suitable for the voltage at which it is used.

The panels of insulating material may be omitted if each piece of equipment carried on the switchboard is provided with an individual base of insulating material of the character specified for the panels and of adequate dimensions, or has its current-carrying parts mounted on similar insulation self-contained in the equipment, which shall be especially designed for mounting on iron pipe, angle-iron, or bar-iron frameworks.

Rule 1112. Danger Signals

All medium and high voltage machines and apparatus shall be conspicuously marked by the use of the word "danger."

Rule 1113. Overhead Lines

Overhead transmission lines between the generating station or substation and the quarry entrance, shall be supported upon insulators, which shall be adequate in quality, size and design for the voltage transmitted. Where such line is more than five hundred (500) feet in length, lightning arresters shall be installed in connection therewith at the entrance to the quarry. Such line, except in the case of trolley wires, shall be maintained not less than ten (10) feet above the ground at the lowest point.

Rule 1114. Branch Circuits

Every branch circuit shall be provided with a switch of ample carrying capacity, on each phase, within fifty (50) feet of the point where it leaves the main circuit.

Rule 1115. Lighting Circuits

Wires for all lighting circuits shall be covered with an insulation adequate for the voltage of the circuit, and, unless encased in pipes or other metallic covering, shall be strung on porcelain or glass insulators. Separate uncased wires shall be kept at least three (3) inches apart, except where they enter the fittings. Metallic casings, if used, shall be efficiently grounded.

Rule 1116. Cables Entering Fittings

(a) The exposed ends of cables where they enter fittings of any description shall be so protected and finished off, that moisture cannot enter the cable, or the insulating material leak out, if of an oily or viscous nature.

(b) Where unarmored cables or wires pass through metal frames or into boxes or motor casings the holes shall be substantially lined with insulated bushings.

Rule 1117. Joints in Conductors

All joints in conductors shall be mechanically and electrically efficient and shall be soldered wherever necessary. All joints in insulated wire shall, after the joint is complete, be re-insulated to the same extent as the remainder of the wire.

Rule 1118. Joints in Cables

Where cables are joined, suitable junction boxes shall be used, or the joints shall be soldered, and the insulation, armoring, or leading covering, replaced in as good condition as it was originally.

Rule 1119. Fuses, Circuit Breakers and Switches

(a) Fuses and automatic circuit breakers shall be constructed so as effectually to interrupt the current when a short circuit occurs or when the current through them exceeds a predetermined value. No open type or link fuses shall be used.

(b) All points at which a circuit has to be made or broken, shall be provided with proper switches, which shall be so installed that they cannot be closed by gravity.

(c) Fuses shall be stamped or marked, or shall have a label attached, indicating the maximum current that they are intended to carry. Fuses shall be adjusted or replaced only by an authorized and competent person.

(d) The capacity of fuses used to protect feeders shall not exceed the current capacity of the feeder by more than twenty-five (25) per cent.

(e) All switches, circuit breakers and fuses shall have non-combustible bases.

Rule 1120. Stationary Motors

Every stationary motor and every portable motor, together with its starting device, shall be protected by a fuse on each phase or (in the case of motors of more than forty (40) horse

power) by a circuit-breaking device on at least one phase of direct-current motors and on each phase of alternating-current motors, and by switches arranged to cut off entirely the power from the motor. The above devices shall be installed in a convenient position near the motor and in sight of it.

Rule 1121. Electric Lighting

(a) Lamp Sockets. The exterior of the sockets of all fixed incandescent lamps, installed after these rules go into effect, shall be entirely non-metallic.

(b) Flexible Lamp Cord. The use of flexible lamp cord for lighting connections is prohibited, except for portable incandescent lights to be used in connection with the inspection and repair of machinery and equipment, and in that case the cord shall have extra heavy insulation. Such portable lights shall be protected by a wire cage large enough to inclose both lamp and socket and shall be provided with a handle to which the light and socket shall be firmly attached and through which the leading-in wires shall be carried.

(c) Incandescent Lamps. Incandescent lamps shall be so placed that they cannot come into contact with combustible material; and shall be so placed that an adequate circulation of air may take place on all sides of them.

Rule 1122. Duties of Employees

Every employee shall be responsible for carrying out all rules which immediately concern or affect his conduct.

Penalties

Section 1275 of the Penal Law:

Any person who violates or does not comply with any provision of the Labor Law, any provision of the Industrial Code, any rule or regulation of the Industrial Board of the Department of Labor or any lawful order of the Commissioner of Labor * * * is guilty of a misdemeanor and upon conviction shall be punished, except as in this chapter otherwise provided, for a first offense by a fine of not less than twenty nor more than fifty dollars; for a second offense by a fine of not less than fifty nor more than two hundred and fifty dollars, or by imprisonment for not more than thirty days or by both such fine and imprisonment; for a third offense by a fine of not less than two hundred and fifty dollars, or by imprisonment for not more than sixty days, or by both such fine and imprisonment.

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